Research proposal

Title: "GROWTH AND NUTRITIONAL STATUS AMONG BOYS AND GIRLS OF HATHIN BLOCK OF DISTRICT PALWAL, HARYANA"

Introduction:

India is progressing dynamically in every field. Today, the boom in economy, innovative technologies and improved infrastructure has become nation's pride. Children of today are citizen of tomorrow, hence it is extremely important to ensure proper health care facilities as well as adequate nutritional intake for the children. It is now globally acknowledged that the investment in human resource development is a pre requisite for any nation. Early childhood, which is the first 6 years constitutes the most crucial period in the life where the foundation are laid for cognitive, social, emotional, and physical development.

The children of today are the future of tomorrow; this powerful statement assumes special significance in Indian context, as children (0-14 years) comprise one third of the total population in the country. Every child, on provision of a conductive and an enabling environment, may blossom into an ever fragrant flower, to shine in all spheres of life. This reminds us of the gorgeous responsibility that we have to mould and shape their present conditions in the best possible way.

The journey in the life cycle of a child involves the critical components of child survival, child development and child protection. Child participation which envisages their active involvement and say in the entire process adds a new dimension. Child survival entails their basic right of being born in a safe and nondiscriminatory environment and grows through the formative years of life in a healthy and dignified way. Adverse sex ratio at birth, high child mortality rates and the rapidly declining child sex ratio reflects the ensuing challenges. Reducing the level of malnutrition and micronutrient deficiency and increasing enrolment, retention, achievement and completion rates in education are the focus areas in child development. Safeguarding the children from violence, exploitation and abuse fall under child protection.

Realizing the deprived and vulnerable conditions of children, the law makers of the country have always accorded a privileged status to children. The number of rights and privileges given to the children in the Constitution of India, duly supported by legal protection, bears a testimony to this. During the last decade, various path breaking legislations like the Prohibition of Child Marriage Act, 2006; Hindu Succession (Amendment) Act, 2005 etc have been made to suitably strengthen the legal provisions. On policy side, the Government of India is committed to promote the survival, protection;

development and participation of children in a holistic manner and a series of measures cutting across the boundary of gender, caste, ethnicity or region have been initiated in the past several years to realize the all inclusive growth devoid of exclusion and discrimination. The 11th Five Year Plan paved the way and the commitments have been reiterated with a renewed vigor in the 12th Five Year Plan.

However, even today, after six decades of independence and despite various initiatives both on the legal as well as policy and programme levels, the condition of children remains a cause of concern in the country. The statistics emanating from various censuses, surveys and administrative records underlines this.

Growth is the Process of an individual organism growing organically. A Purely biological unfolding of events involved in an organism changing gradually from a simple to mare complex levels. A phenomenon peculiar to the pediatrics age group is growth and development. The term growth refers to increase in the physical size of the body and development to increase in skills and functions. Growth and development are considered together because the child grows and develops as a whole growth and development is not only physical aspect but also intellectual, emotional and social aspects.

Normal growth take place only if there is optimal nutrition, if there is freedom from recurrent episodes of infections adverse genetic and environmental influences. Maternal and Child Health Care is concerned with the process of growth and development, which is the foundation of human life. Genetic factors influence growth and development, especially height and weight. Nutrition influences growth and development before as well as after birth. Retardation of growth rate is an indication of malnutrition. When diet is improved the child begins to grow in height and weight.

Growth rate is maximum during foetal life and during the first year of life and then again at puberty. At about the age of 10-11 years female children show a sudden increase in height and weight. This growth spurt corresponds to puberty. In male children, the growth spurt occurs a little later i.e. between 12-13 years.

Different tissues and different regions of the body mature at different rates and the growth of a child consists of a highly complex series of changes. The change in the growing child can be thought of in two different ways: (i) Growth attained at successive ages (ii) The increments from one age to the next, expressed as rate of growth per years. If growth is thought of as a form of motion, the growth at succeeded ages can be considered the distance traveled and the rate of growth reflect the child's state at any particular time better than the height attained which depends largely on how much the child has grown in all preceding years.

Growth studies have demonstrated that malnutrition may cause serious impairment of growth. The term malnutrition generally refers to the effects of an inadequate intake of calories or other major dietary components such as proteins. Malnutrition may also result from diseases which decreases the appetite of interfere with digestion and assimilation. In developing countries malnutrition in children is one of the inherent health problems. According to estimates about 100 million children suffer from protein energy malnutrition (PEM) in south East Asia alone.

India is one among the many countries where child malnutrition is severe and also malnutrition is a major underlying cause of child mortality in India. The problem has sought the attention of policy makers and researchers for several decades. Various studies and surveys have been conducted to find out the root causes of child malnutrition. National Family Health Surveys (NFHS) reveal that malnutrition is not the result of a single cause; the problem is multifaceted, the causes acting singly or in combination with other complex factors like poverty, purchasing power, health care, ignorance on nutrition and health education, female illiteracy, social convention etc.

It is an established fact that, economic conditions of the family have huge impact on the nutritional status of children, which has been supported by the survey results. NFHS 3 (2005-06), reveals 76.4% of children (6-59 months) in the lowest wealth index are suffering from anaemia whereas 56.2% children of the highest wealth index are suffering from anaemia. This is indicative of the reality that affluence alone cannot rule out anaemia among children. Anaemia prevalence among children of (6-59 months) is more than 70 percent in Bihar, Madhya Pradesh, Uttar Pradesh, Haryana, Chhattisgarh, Andhra Pradesh, Karnataka and Jharkhand. Anaemia prevalence among children of (6-59 months) is less than 50 percent in Goa, Manipur, Mizoram, and Kerala. For the remaining states, the anaemia prevalence is in the range of 50% - 70% (Annual Health Survey 2010-11).

In spite of the recent progress in health sector, as exhibited by the statistical indicators, the situation is not adequate to ensure a bright future to the children of India. This is a multifaceted problem which is directly linked to a large extent to mother's health conditions and the safe delivery conditions and also the socio economic conditions of the family along with the country's health care system. Over the time, the nation has implemented a number of child centric program, much remains to be done to guarantee better health conditions to the children.

A majority of malnourished children fail to achieve their full genetic potential of body growth (both linear and pond real) and are thus stunted or wasted or both. Studies on growth and development of children provide important information on the nutritional monitoring of child growth is very

important particularly for a vast multi ethnic and multi cultural country like India where growth and nutritional status of children vary from region to region and state to state.

Review of literature:

Anthropometry is considered to be an important tool of for assessing Growth and nutritional status. Nutritional anthropometry concern with the measurement of the various physical dimensions and the gross composition of the human body at different age. It gives valuable information covering certain types of malnutrition in which body size and gross body composition are affected (Jelliffe, 1966). Knowledge of the nutritional status of a community is necessary to have a comprehensive idea about its development process, as undernutrition is one of the major health problems in the developing countries. It was reported that the basic causes of undernutrition or malnutrition in developing countries are poverty, poor hygienic conditions and little access to preventive health care (Mitra, 1985; WHO, 1990). Inadequacies in nutritional intake or under nutrition can be considered as a major source of many adverse effects on the growth and development of individual (Gorden et al. 1968).

A number of growth studies were carried out in different part of our country from1960's onward Udani (1963), Ghai et al. (1970), Kaul (1971),Agrawal and Sen (1974), Katiyar et al (1978), Shinde et al. (1989), Mathur et al (1972) were made significant contribution in this field. Khongsdier (1996) studied Khasi Children of Meghalaya to find out the growth patterns he described that the girls begin their adolescent growth spurt at the age of 10 and gain the maximum growth velocity of 3.25 cm at 12 years of age. The maximum gains in fat occur at the age of 13 years.

There are numbers of studies on the effect of socio- economic status on human growth (Pagliane 1876; Baneditct 1877, 1879 and 1891; Meredith 1941 and 1951; Hopkins 1947; Tanner 1962). Gautam (2007) provided comparative information with the conclusion that people in the upper socio- economic status are more advanced at all age levels along the course of maturity.

It is reported that the most important of all the environmental factor is nutrition (Jelleife and Jelliffe 1960; Garn an Rehman 1966; Rao and Singh 1971; Rao and Rao 1975; Choudhary 1975) which effect growth in human being. In the growing human body the multiplication of cells or their enlargement in size depend upon adequate supply of energy, amino acids, lipids, vitamins and minerals.

Takahasi (1984) found an association between change in dietary practices and growth in Japan. He found an association between milk composition and increased growth in biacromian.

The influence of heredity on the growth and development of individual child was addressed by Bock (1985), he believes that tallness is a genetically determined characteristic and is being inherited from parents to offspring.

Generational changes have been observed in the body size and other developmental features of children at all ages during the period of growth, (Wof 1940 and1941; Meredith 1941 and 1963; Damon 1965 and 1968; Miller 1970; Maline 1972; have found the children to be maturing earlier, growing taller and heavier with successive generations.

Anthropometric measurements like stature, sitting height, weight and indices based on these measurements like body mass index (BMI) have been extensively used to define the extent of malnutrition. Boas (1911), Guthe (1918) and various other workers have shown that there were changes in head length and head breadth with increasing age.

Fischer (1936) stated that with increase in height the skull becomes somewhat more elongated. Height of an individual is partly conditioned by nutrition and other factors during growth this may result in the increase or decrease of cephalic index corresponding to the increase or decrease in height.

Aykroyed (1938) described the importance of the measurement of the arm, chest and hip circumference to direct malnutrition. Nabbarro and McNab (1980) concluded from their study that anthropometric assessment is a valuable approach to the identification of the acutely malnourished children.

Recently in India, the study of Nutrition and growth has attracted the attention of research workers. There were some sporadic attempts to study growth changes in body size as part of diet and nutrition surveys and are reported in the findings of Aykroyed and Raj Gopal (1936), Aykroyed and Krishnah (1937), Aykroyed et al (1938), Wilson et al (1937), Narinder Singh (1939), Shourie (1939), Mitra(1940), Bhave (1941), Wilson and Widdeneson (1942), Rao et al (1954) and Several others.

Studies on the basal energy metabolism in Indian population were conducted by Mukherjee and Gupta (1930), Masan and Benedict (1931), Krishan and Vareed (1932), Rahman (1936), Sikey and Malandkar (1939), Benerjeeet. al. (1963), Mason et. al. (1963), Banerjee et. al. (1948), Benerjee and Bhattacharya (1967), Benerjee and Sen (1957) published monographs for calculating the body surface area of Indian. Bhattacharya and Banrjee (1966) studies vital capacity of Indian children and young adult.

Various studies on assessment of nutritional status was reported from India such asTrivedi et al (1971); Bhandari et al (1972); Godre (1973); Gupta et al (1979); Rama Kutty et al (1981); Dewey (1983); Choudhary and VisweswaraRao (1983); Rao et al (1990); Khongsdier (2001); Adak et al (2006); Gautam et al (2006) and Gautam (2007).

Body Mass Index (BMI) can be a good parameter to grade chronic energy deficiency in adults (Naidu et al (1991); Ferro-Luzzi et al (1991); khongsdier(2001); Gautam et al (2006), Gautam(2007 and 2013).

Some other studies focused on growth and nutrition are Talwar and Kour (1999); Mitra et al (2002); Chakma et al (2009); Mondal and Sen (2009 and 2010);Nandy et al (2010) Sachan et al (2012); Basu et al (2013); Deb and Dhara (2013); Patil et al (2013); Thakur and Gautam (2014).

Area and People:

India, officially the Republic of India is a country located in South Asia. It is the seventh largest country with area of 32,87,263 sq km, and second most populous country with population over 1.21 billion. It is one of the largest democracies in the world. India is a multi-ethnic country; there is wide variation in terms of culture, religion, language etc. Total population of India according to census 2011 is 1,210,854,977. Growth rate is 13.12% per decide and birth rate is 20.6 per thousand people and life expectancy is 67.14 year.

Haryana;

Haryana is a state in north India with its capital at Chandigarh. It came into existence on 1st November 1966 as a newly created state carved out of the Punjab state on the basis of language. It has been a part of the Kuru region in North India. It is bordered by Punjab and Himachal Pradesh to the north and by Rajasthan to the west and south. The river Yamuna defines its eastern border with Uttrakhand. Haryana also surrounds the country's capital Delhi from three sides, forming the northern, western and southern borders of Delhi. Consequently, a large area of south Haryana is included in the National Capital Region for purposes of planning for development.

Haryana was administered as part of the Punjab province of British India, and was carved out on linguistic lines as India's 17th state in 1966. Haryana is now a leading contributor to the country's production of food grain and milk. Agriculture is the leading occupation for the residents of the state. Haryana contributed heavily to the Green Revolution that made India self-sufficient in food production in the 1960s.

Haryana is also one of the wealthier states of India and had the second highest per capita income in the country 138,859 in the year 2011–12 and 128,341 in the year 2012–13 including the largest number of rural millionaires in India. Haryana is also one of the most economically developed regions in South Asia and its agricultural and manufacturing industry has experienced sustained growth since the 1970s. Haryana is India's largest manufacturer of passenger cars, two-wheelers, and tractors. Since 2000, the

state has emerged as the largest recipient of investment per capita in India. The city of Gurgaon has rapidly emerged as a major hub for the information technology and automobile industries. Gurgaon is home to Maruti Suzuki, India's largest automobile manufacturer, and Hero Moto Corp, the world's largest manufacturer of two-wheelers. Faridabad, Panchkula, Dharuhera, Bawal, Sonipat, Panipat, Yamuna Nagar and Rewari are also industrial hubs, with the Panipat Refinery being the second largest refinery in South Asia. There are also long established steel, plywood, paper and textile industries in the state.

Palwal District;

Palwal District is the 21st district of Haryana state in northern India. Palwal city is the headquarters of this district. The city is situated at a distance of 60 km from Delhi on the Delhi-Mathura highway (NH-2). The latitude of the town is 28° 40' N and longitude is 76° 59' E. The area of town is 22.10 km². Palwal is located at 28.15°N 77.33°E. It has an average elevation of 195 metres (639 ft).

Palwal consist many temples, Schools, Collage, banks as regard of the infrastructure facilities. It also contains developed areas like Housing board colony, New colony, Main market, Shivapuri, Krishna colony, camp colony, Huda sector 2, etc. Government is also putting more emphases toward the economy and development of Palwal as it is situated in mid of developed cities like Delhi, Gurgone, Noida, Faridabad, Mathura at and about an equiv-distance, It consist agriculture based areas as well as commercials areas.

The city Palwal got its name from a demon, "Palwasur" who ruled this place during the reign of Pandavas. He was killed by Balarama, elder brother of Shri Krishna. In his memory, every year a festival is organised in palwal which is known as "Baldev Chhat Ka Mela". There is also a temple dedicated to Balaram near Municipal Office chowk. Railway Station of Palwal is the place from where Mahatma Gandhi was arrested first time. A historical building "Gandhi Ashram" was made in the memory of Mahatma Gandhi. Syed Yusuf Ali Palwali was a noble and rich man from Palwal during the short ruling period of Muhammad Azam Shah and died along with Muhammad Azam Shah on 19 June 1707 at the battle of Jajuwan.

During the British period, Palwal was a part of the Punjab Province and a part of Gurgaon district. Many persons from Palwal participated in the 1857 revolt against the British forces. Hayat Ali and Khairat Ali were martyred along with 17 people from Palwal only. Hayat Ali after arrest from his house was taken to Delhi and hanged. All male members of his family were ordered to be

hanged. Amongst the 17 people who were hanged in Palwal included the son-in-law of Hayat Ali, whose name was Iradat Ali bin Rustam Ali.

On 15 August 1979, Gurgaon district was further divided to form a new Faridabad district, and Palwal became a part of it. Finally Palwal became the 21st district of Haryana on 15 August 2008. According to the census 2011 district has a population of 1,040,493, roughly equal to the nation of Cyprusor the US state of Rhode Island. Its population growth rate over the decade 2001–2011 was 25.49%. Palwal has a sex ratio of 879 females for every 1000 males, and a literacy rate of 70.3%.

Study Area: Hathin Tehsil

Hathin is a Tehsil in Palwal District of Haryana State, India. It is located 16 KM towards South from District head quarters Palwal. Hathin Tehsil is bounded by Palwal Tehsil towards North, Punahana Tehsil towards South, Hodal Tehsil towards South, Nuh Tehsil towards west. Tehsil Hathin consist of 69 Villages and 69 Panchayats. This Place is in the border of the Palwal District and Mewat District.

Demographics of Hathin Tehsil

Total population of Hathin Tehsil is 203,867 living in 29,153 Houses, Spread across total 69 villages and 69 panchayats. Males are 108,925 and Females are 94,942Total 10,916 people's lives in town and 192,951 lives in rural areas.

Weather and Climate of Hathin Tehsil

It is Hot in summer. The highest day temperature during summer is in between 25°C to 47°C.Average temperatures of January is 15°C, February is 17°C, March is 25°C, April is 32°C, May is 37°C.

Hypothesis:

1. Delayed growth is common among Indian boys and girls.
2. The nutritional level of boys and girls are poor in the study area or among Indians in general.
3. Stunting is common among Indian children in general as well as in study area.
4. Underweight is common among Indian children in general as well as in study area.

5. Wasting is common among Indian children in general as well as in study area.
6. There is dual burden of malnutrition, at one end there is undernutrition on the other obesity is also emerging among the children.
7. There are several factors affecting growth and nutritional status of children during early age, adolescent and later stage.
8. The onset of adolescence symptoms among boys and girls varies according to their bio-social characteristics.
9. The onset of eruption of teeth varies among boys and girls.
10. The gender difference in Human Growth and development is common, but the extent may vary.

General Objectives

To study growth and nutritional status among girls and boys of 0 to 20 years of age of Hathin block of district Palwal, Haryana.

Specific objectives

1. To study the age wise growth pattern among the boys and girls.
2. To study the annual growth rate and its variation during 0-20 years of age.
3. To study nutritional status using anthropometric measurement and clinical examination etc.
4. To find out the onset of adolescence symptoms among boys and girls.
5. To evaluate the school health service in the study area.
6. To find out the age of eruption of teeth and its determinants.
7. To understand the gender difference in Human Growth and development.
8. To compare the present finding with reference data (NCHS and WHO).

Material and Methods

The proposed study would be based on a cross sectional survey on a total of 2360 boys and girls belonging to age zero or birth to 20 years of age of Hathin block of Palwal district of Haryana.

Universe of the study

The proposed study would be conduct in Hathin block of Palwal District of Haryana.

Sampling:

Mixed sampling techniques would be adopted to select the universe and its sub-units followed by selection of girls and boys. The subject would selected purposively and due care would be taken to include only those subject who would be physically and mentally normal and did not suffer from any apparent illness, which may affected their normal process of growth and development.

Sample Size: A total of 2360 boys and girls would be recruited. The age wise distribution of the sample is given below.

Age	**Category**	**Sample size**		
		Girls	**Boys**	
0 Days		100	100	
7 days	7-10 Days	20	20	
1 Month	25-35 Days	20	20	
3 Month	80-100 Days	20	20	
6 Month	5 ½- 6½ Month	20	20	
12 Month	11-13 Month	50	50	
2 Years	20-26 Month	50	50	
3 Years	30-40 Month	50	50	
4 Years	40-55 Month	50	50	
5 Years	4½-5 ½ Years	50	50	
6 Years		50	50	
7 Years		50	50	
8 Years		50	50	
9 Years		50	50	
10 Years		50	50	
11 Years		50	50	
12 Years		50	50	
13 Years		50	50	
14 Years		50	50	
15 Years		50	50	
16 Years		50	50	
17 Years		50	50	
18 Years		50	50	
19 Years		50	50	
20 Years		50	50	
Total		1180	+1180	=2360

Methodology: For this study, following tools would be used for data collection:

1. Anthropometric measurements
2. Interview
3. Semi structured Schedule
4. Observation
5. Secondary information

Instruments:

1. Anthropometer rod
2. Digital weighing machine
3. Skin fold caliper (Harpenden)
4. Spreading caliper
5. Measuring Tape

Assessment of nutritional status and annual growth:

The nutritional status of an individual is often the result of many interrelated factors there are direct and indirect indicator for assessing nutritional status of children. No single method can provide a complete picture of nutritional status of the child and hence it is necessary to use a combination of methods, keeping in view the objective and availability of resources, following technique would be adopted for nutritional assessment:

1. **Direct indicators**
   - Clinical examination.
   - Anthropometric measurement.
2. **Indirect indicators**
   - Morbidity
   - Assessment of dietary intake.
   - Socio-economic status.

Clinical examination: Examination of individual for presence of clinical sign of nutritional deficiencies is one of the important methods of nutritional assessment. It involves identification of physical change either in the surface of epithelium of various parts of the body (such as skin, eye, hair, teeth), which are attributable to inadequate nutrition. In the study a total of 24 clinical

disorders for protein energy malnutrition, micronutrient deficiency, and essential fatty acid deficiency would be investigate.

Anthropometric measurement: For the present study a total of 14 measurements would be taken. The instruments were standardized and technical errors were calculated in the laboratory. The following measurement will be taken on each individual.

1. Body weight
2. Height /Stature
3. Sitting height
4. Head length
5. Head breadth
6. Head circumference
7. Upper arm circumference
8. Chest circumference
9. Waist circumference
10. Hip circumference

Skin fold Measurements

11. Biceps Skin fold
12. Triceps Skin fold
13. Sub scapular Skin fold
14. Supra iliac Skin fold

Statistics used:

1. Arithmetic Mean
2. Standard Deviation
3. Coefficient of variation
4. Chi- square (χ^2) Test
5. T- test
6. Regression Analysis
7. Z-Score (standard score)
8. Composite Index of Anthropometric Failure
9. Basal Metabolic Rate and Resting Metabolic Rate Equations

Expected Outcome:

On the basis of present investigation following outcome are expected:

1. The information regarding growth pattern of boys and girls, its deviation from international references (NCHS and WHO) and contemporary population and can be understood, accordingly intervention can be planned.
2. Information about nutritional status of boys and girls of target group i.e. 0-20 years would be available for intervention.
3. Information about extent of stunting, wasting and undernutrition among the target group would be available.
4. Onset of obesity, if any and its extent can be understood.
5. Factors affecting growth and nutritional status of children during early age, adolescent and later stage would be available.
6. Onset of adolescent symptoms like age at menarche among girls and its correlation with growth and nutritional status would be available.
7. The age of eruption of teeth and its determinants among boys and girls would be available.
8. The gender difference in Human Growth and development can be re-established.
9. After this study, we would be able to understand the real scenario of school health services in the study area.

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